UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/018,709	03/27/2002	Jacques Beauvir	GER-0301	1671

23413 7590 10/06/2003

CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER	
LEADER, WILLIAM T	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/018,709	BEAUVIR, JACQUES	
	Examiner	Art Unit	
	William T. Leader	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4, 6,and 9-14* is/are rejected.

7)☒ Claim(s) *5,7 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4, 6 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hanagata et al (5,147,515).

3. The Hanagata et al patent is directed to a method for forming ceramic films by anode spark deposition. A workpiece made of a metal such as aluminum is immersed in an electrolytic bath which is an aqueous solution containing at least one oxyacid salt. In example 1 the salt is $Na_2B_4O_7$, while in example 3 $Na_4P_2O_7$ was used. The pH of the bath may range up to a highly alkaline 13.5 (column 2, lines 62-64). Hanagata et al disclose that it is known to include an alkali metal hydroxide in baths used to form coatings by spark discharge (column 1, lines 24-30). In baths with an alkaline pH hydroxide would be present. Hanagata et al disclose the use a current having a saw-tooth waveform (column 4, lines 17-20). This is a triangular waveform, meeting the limitation of instant claim 1. In the examples of Hanagata et al, the current density is controlled to a particular value meeting the

limitation of claim 1 that current is controlled in intensity. The power supply which generates the sawtooth waveform would necessarily control the ratio of positive to negative intensity in forming the sawtooth wave. Thus, all limitations of instant claim 1 are met.

4. As noted, in the examples of Hanagata et al the current density is controlled. Hanagata et al disclose that the voltage varies depending on various factors such as the waveform and bath composition, but desirably ranges from 50 to 200 volts. The voltage observed during the film formation is increased as the spark discharge proceeds, and the final voltage sometimes exceed 1,000 V. See column 4, lines 21-28. By starting with a voltage less than the range of 300-600 volts and ending with a voltage above the range of 300-600 volts, the process of Hanagata et al makes the value of the triangular voltage change between 300 and 600 V during the process as recited in instant claim 4. The value of current is fixed independently of the value of the voltage as recited in instant claim 6. Hanagata et al disclose that metals to be treated include aluminum and aluminum alloys (column 3, lines 45-50), meeting the limitation of instant claim 13.

5. Claims 1, 2, 9, 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Samsonov et al (5,616,229).

6. The Samsonov et al patent is directed to a process for coating metals with a ceramic coating using an anodic spark discharge technique. The electrolytic bath comprises an aqueous solution of an alkali metal hydroxide such as sodium or potassium hydroxide (column 3, lines 39-45). The bath may also include a salt containing a cation of an alkali metal and an oxyacidic anion (column 4, lines 26-33). Figure 1 illustrates a current with a controlled waveform that is applied to the workpiece. The current has a triangular shape, and has been modified from the standard sinusoidal to optimize the coating effect (column 4, lines 55-60). The current rises from zero to its maximum height and falls to below 40% of its maximum height within less than a quarter of a full alternating cycle (abstract). Thus, the waveform and ratio of positive to negative intensity are controlled. All limitations recited in instant claim 1 are met.

7. As shown in figure 1, the rising and falling slopes are approximately symmetric as recited in instant claim 2. The waveform and electrical power values are separately controlled as in instant claim 9. The coating may be applied to aluminum as recited in instant claim 13 (see the abstract). Sodium or potassium hydroxide may be added to the bath (column 3, lines 39-45) meeting the limitation of instant claim 14.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 4, 6, 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanagata et al (5,147,515) in view of Kauffman (5,071,527). Hanagata et al is taken as above. As previously observed, Hanagata et al discloses the use of a sawtooth waveform, but does not specifically state that a sawtooth waveform is a triangular waveform. The Kauffman patent is cited to verify that a sawtooth waveform is a triangular waveform as recited instant claim 1, and may have approximately symmetric rising and falling slopes as recited in instant claim 2. Kauffman describes the potential variation shown in figure 1 as an initially applied value E1, which is linearly increased over time to a second value E2; the potential is next reduced at the same rate until the potential again returns to E1; the potential continues to be reduced until it reaches a third value E3, and is then increased until it returns to E1 producing a sawtooth waveform (column 4, lines 35-42). The prior art of record is indicative of the level of skill of one of ordinary skill in the art. If not inherent, the use of a sawtooth waveform which has a triangular

configuration would have been obvious at the time the invention was made because Kauffman shows in figure 1 that a sawtooth waveform is triangular. The bath of Hanagata et al contains ions of sodium and hydroxide suggesting the limitation of instant claim 13.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanagata et al (5,147,515) in view of Kauffman (5,071,527) as applied to claims 1, 2, 4, 6, 13 and 14 above, and further in view of Cohen (4,923,574).

11. Claim 3 differs from the process of Hanagata et al by reciting that the slopes of the triangular signal are asymmetric. The Cohen patent is directed to a coating process in which voltage with a variety of waveforms such as square, triangular or trapezoidal may be used. Figure 7 illustrates a triangular waveform. The values of t_1 and t_2 are unequal resulting in a waveform which is asymmetric. It would have been obvious at the time the invention was made to have utilized an asymmetric triangular waveform in the process of Hanagata et al because such a waveform is useful in forming a coating as shown by Cohen. As previously noted, the voltage increases as the process of Hanagata et al progresses. This voltage increase would cause the slopes of the voltage signal to vary as recited in claim 3.

12. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goolsby et al (5,605,615) or Chen et al (5,141,602) in view of Matanabe et al (5,705,230) and Polan et al (4,468,293).

13. Claim 10 is directed to an electronic generator. The Goolsby et al patent is directed to apparatus for applying a coating to a workpiece and includes an electronic generator power supply system. The main components of the power supply system are shown in figure 2. The system is adapted to be powered from an input of standard commercial power from the mains, and to provide an output with a controlled waveform. The system includes waveform generator 20 to generate the desired waveform. Along with driver circuit 30, this corresponds to the module for converting a sinusoidal signal to a trapezoidal or sawtooth signal. The waveform applied to the workpiece is modified by software control 83 through digital control circuit 85 and the input from switch 60 and associated circuitry. The system may operate in different modes. In a voltage forcing mode, driver 30 outputs a programmable pulse train of multiple levels of voltages at programmable duty cycles and programmable frequencies (column 3, lines 15-19). A plurality of parameters are analyzed and controlled (column 4, line 47 to column 5, line 7). The system includes circuitry for controlling the slope and form factor of the signal, frequency and parameterized energy.

14. The Chen et al patent is directed a coating method and apparatus. The basic elements of the apparatus are shown in figure 8. As is the system of Goolsby, the system of Chen et al is adapted to be powered from an input of standard commercial power from the mains, and to provide an output with a controlled waveform. The system includes waveform generator 103 to generate the desired waveform. Along with the AC voltage/current power amplifier 104 this corresponds to the module for converting a sinusoidal signal to a trapezoidal or sawtooth signal. The waveform applied to the workpiece is modified by computer control. A plurality of parameters is controlled. These include frequency, voltage ramp rate and current ramp rate. See Table I. Data acquisition board 102 monitors process parameters and allows control based on the monitored values. The system includes circuitry for controlling the slope and form factor of the signal, frequency and parameterized energy.

15. Goolsby et al and Chen et al differ from the apparatus of claim 10 by not specifically indicating that the waveform generators are capable of generating a sawtooth (triangular) or trapezoidal signal. The Matanabe et al patent is directed to a coating process and indicates that various pulsed waveforms such as square waves, trapezoidal waves and triangular waves may be used (column 2, lines 46-48). The Polan et al patent is directed to a method and apparatus for coating. The apparatus includes function generator 20 to provide current with the desired waveform (column 7, lines 18-20). The generator is capable of supplying a variety of

waveform signals such as a square waveform, a triangular waveform or a sinusoidal waveform as shown in figures 2-4. Polan et al teach that any suitable waveform may be used. See column 7, lines 29-34. It would have been obvious at the time the invention was made to have provided the apparatus of Goolsby et al or Chen et al with the capability of generating trapezoidal or sawtooth waveforms because Matanabe et al and Polan et al teach that a variety of waveforms such as triangular and trapezoidal are useful in coating and Polan et al shows that a waveform generator such as those of Goolsby et al and Chen et al are capable of generating a variety of different waveforms such as triangular waveforms.

16. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goolsby et al (5,605,615) or Chen et al (5,141,602) in view of Matanabe et al (5,705,230) and Polan et al (4,468,293) as applied to claims 10 and 12 above, and further in view of the Samsonov et al.

17. Claim 11 additionally differs from the apparatus suggested by Goolsby et al and Chen et al by including an isolating transformer with series-connected capacitors. Samsonov et al discloses the use of an isolating transformer 20 and series-connected capacitor 22. See figures 3 and 4. It would have been obvious at the time the invention was made to have included an isolating transformer and series-connected capacitor in the apparatus suggested by Goolsby et al and Chen et

al as shown by Samsonov et al because performance of the apparatus would have been improved.

18. Claims 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Samsonov et al in view of Goolsby et al or Chen et al and further in view of Matanabe et al and Polan et al.

19. Samsonov et al, Goolsby et al, Chen et al, Matanabe et al and Polan et al are taken as above. Claim 10 differs from the apparatus of Samsonov et al by reciting a plurality of modules which control the waveform applied to the workpiece. As discussed above, the functions of these modules are accomplished by the circuitry of Goolsby et al and Chen et al. It would have been obvious to have included the control circuitry of Goolsby et al and Chen et al in the apparatus of Samsonov et al because more precise control of the coating operation would have been achieved. As noted above, while Goolsby et al and Chen et al do not specifically indicate that the waveform generators are capable of generating a sawtooth (triangular) or trapezoidal signal, it would have been obvious at the time the invention was made to have provided the apparatus of Goolsby et al or Chen et al with the capability of generating trapezoidal or sawtooth waveforms because Matanabe et al and Polan et al teach that a variety of waveforms such as triangular and trapezoidal are useful in coating and Polan et al shows that a waveform generator such as those of

Goolsby et al and Chen et al are capable of generating a variety of different waveforms such as triangular waveforms.

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Patel et al (6,197,178) is directed to a process for forming ceramic coatings by micro-arc oxidation. As shown in figure 2B the waveform used in the process has a generally triangular or trapezoidal shape.

21. Claims 5, 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Samsonov et al discloses varying the composition of the electrolyte while the ceramic coating is being formed. However, the prior art of record does not suggest an electrolytic process for plasma microarc oxidation as recited in claim 1 where the frequency of a triangular signal is caused to vary between 100 and 400 Hz as the process is carried out; or of independently varying the form factor, potential, frequency and current during the process; or of simultaneously varying the form factor, potential, frequency, current and the UA/IC ratio during the process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 703-308-2530. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached on 703-308-1146. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700

William Leader
September 22, 2003